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LXIX. *A Discourse on the Usefulness of Inoculation of the horned Cattle to prevent the contagious Distemper among them. In a Letter to the Right Hon. George Earl of Macclesfield, P. R. S. from Daniel Peter Layard, M. D. F. R. S.*

My Lord,

Read Feb. 2. 1758. **T**HE honour you have done me, in condescending to peruse my Essay on the contagious Distemper among the horned Cattle, claims my most respectful thanks; and I am no less obliged to your Lordship for the just remark you made, “ That before inoculation could be practised on the horned Cattle, it is necessary to bring proofs, that this disease is not susceptible more than once; and also assurances, that a recovery from the distemper by inoculation guards the beast from a second infection.”

An intire conviction of the analogy between this disease and the small-pox would not permit me to omit mentioning the great advantages, which must arise from inoculation; and therefore, my Lord, I recommend its use: nor do I find any reason to alter my opinion, after having carefully read over what has been published, and made the strictest inquiry I was able in several parts of Great Britain.

I shall, in the concise manner possible, submit the following particulars to your Lordship’s consideration, and the learned Society, over which you so deservedly preside.

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The Marquis de Courtivron, in two memoirs read before the Royal Academy of Sciences in the year 1748, and published by that learned body, relates the observations he, together with Monsieur Pelversier de Gombeau, formerly surgeon to the regiment de la Sarre, made on the rise, progress, and fatality, of the contagious distemper at Iffurtille, a town in Burgundy; to which are added experiments they made, by application, digestion, and inoculation, towards communicating the disease; and concludes from the failure of these attempts, that the distemper can only be communicated from one beast to another. Besides, notwithstanding the Marquis observes (1) the regularity of the illness, the critical days, on the seventh and ninth, and particularly that all such as recovered had more or fewer pustules broke out in different parts of the body; yet (2) he will not allow of Rammazzini's opinion, of the analogy between this distemper and the small-pox, nor that it is an eruptive fever; but ranks it as a plague.

But the Marquis goes still farther. He positively say, (3) "That in the preceding years, in the provinces of Bresse, Maconnois, and Bugey, some private persons had suffered by buying cattle recovered from the distemper, which had, at that time, the pustules remaining on them: which cattle had the distemper afterwards." Nay, he adds that even after recovering twice, a third infection has seized and killed many."

(1) Memoires de l'Acad. des Sciences, anno 1748. p. 326.

(2) Ibid. p. 338.

(3) Ibid. p. 337.

No wonder, my Lord, that such positive assertions should stagger, and cause the practice of inoculation not to be received, till the nature of the disease be absolutely determined, and facts prove the contrary of what has been asserted.

In a matter of so great importance to every nation, it were to be wished, that the Marquis de Courtivron had produced attested observations of these second and third infections: for tho' a nobleman of his rank, character, and great abilities, would not willingly impose upon the world; yet it may happen, that he may have received wrong informations.

As to the nature, rise, progress, and fatality, of this distemper at Issurtille, it appears to be the same disease as raged in these kingdoms. All the symptoms agree, as described by Rammazzini, Lancisi, the Marquis, and in my Essay. A distempered beast gave rise to the three infections. The illness was every-where the same in Italy, France, and Britain; and either terminated *fatally* on the fourth or fifth day, when a scouring prevented the salutary eruptions, or in some cases by abortion; and on the seventh or ninth *favourably*, when the pustules had regularly taken their course. Tho' the Marquis did not observe, that any particular medicines were of use, he says, that in general acids were beneficial, especially poor thin wines somewhat sour; and that the distempered beasts were all fond of these acids (4).

The fatality was likewise the same, as will appear from the Marquis's tables. Of 192 head of cattle, 176 died. The mortality was chiefly among the fat

(4) See my Essay on the contagious Distemper, p. 70.

cattle, cows with calf, and young sucking or yearling calves ; and of the surviving sixteen, only two calves out of seventy-seven lived, and these two, with seven other beasts of the sixteen, escaped the infection, tho' constantly among the diseased : so that it is plain,

Of 192 beasts, - - 176 died	
	7 recovered
	9 escaped the infection.
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The mortality was as considerable in these kingdoms.

Whoever will compare the appearances, progress, and fatality, of the small-pox, with what is remarked by authors of authority, as Rammazzini and Lancisi, and other observers, relative to the contagious distemper among the horned cattle, will not be at a loss one moment to determine, whether this disease be an eruptive fever, like unto the small-pox, or not.

Now if, as the Marquis has granted in both his memoirs (5), it be a general observation, that an eruption of pustules on some parts of the body, regularly thrown out, digested, and dried, is the means used by nature to effect the cure ; and that in general the morbid matter does not affect the parotid, inguinal, or other glands, nor produce large carbuncles and abscesses, as the plague does : Nay more, since it is observed by the Marquis, that the difference between the contagious distemper of 1745 and 1746, and of 1747 and 1748, was, that in the former the

(5) Pag. 143. and 338.

salutary eruptions appeared, but in the latter were, as he justly apprehends, checked by the excessive cold weather; and should it appear, that by inoculation the same regular eruptive fever has been produced, with every stage, and the same symptoms as arise in the small-pox; the nature of this distemper will then be ascertained.

I shall now proceed, my Lord, to lay before your Lordship and the Society the accounts I have received relating to the infection and inoculation of the cattle, and make some observations on the experiments made at Iffurtille.

So long, my Lord, as the distemper has raged in Great Britain, not one attested proof has been brought of any beast having this disease regularly more than once. I make no doubt but these creatures may be liable to eruptions of different kinds; but as all sorts of eruptions, says Dr. Mead (6), are not the small-pox, nor measles, so every pustule is not a sign of the plague. Thro' ignorance, or fraud, persons may have been deceived in purchasing cattle, and have lost them, as well in England as in the provinces of France mentioned by the Marquis; but until a second infection be proved, the general opinion must prevail in this case, as in the small-pox: for tho' many have insisted on the same thing with regard to the small-pox, yet a single instance, properly vouched and attested, has never been produced, either after recovery from the natural way, or from inoculation; unless what is frequently the case with nurses and others attending the small-pox, that is, pustules

breaking out in their arms and face, be allowed as the signs of a second infection.

The farmers and graziers in Huntingdonshire, Cambridgeshire, Lincolnshire, Kent, and Yorkshire, from whence I have written testimonies, all agree, that they never knew of a beast having the contagious distemper more than once. In this county particularly, Mr. J. Mehew, the farmer mentioned in my Essay, has now among his stock at Godmanchester *eight cows*, which had the contagious distemper the first time it appeared in Godmanchester in 1746. It returned in 1749, 1755, and 1756; the two last not so generally over the town as the two former years. All these four times Mr. Mehew suffered by the loss of his cattle; yet those *eight cows*, which recovered in 1746, remained all the while the distemper was in the farm the three years it raged, were in the midst of the sick cattle, lay with them in the same barns, eat of the same fodder, nay of such as the distempered beasts had left and flabbered upon, drank after them, and constantly received their breath and steams, without ever being in the least affected. Is not this a convincing proof? If in general the cattle be susceptible of a second infection, how comes it, that not one of these *eight cows* were affected?

In the years abovementioned the distemper spared no beast, but such as had recovered from that disease: and this is confirmed to me by Mr. Mehew's father and brother, all the chief farmers of Godmanchester, and is the opinion of all the farmers and graziers in Huntingdonshire, who are so thoroughly convinced of there being no second infection, that
they

they are always ready to give an advanced price for such cattle as have recovered from the contagious distemper.

The Rev. Mr. Scaife, assistant to the Rev. Dr. Greene, Dean of Salisbury, in his parish of Cotterham, Cambridgeshire, acquaints me, that the farmers in that neighbourhood lost, in 1746 and 1747, twelve hundred head of cattle, in 1751 four hundred and seventy; and tells me, that Mr. Ivett, Sayers, Moor, Dent, Lawson, chief farmers at Cottenham, Mr. Taylor, Sumpter, and Matthews, of his own parish of Histon, and the farmers of Wivelingham alias Willingham, unanimously declare, they never had one instance of a beast having the distemper twice.

Mr. Thorpe, a farmer and grazier near Gainsborough in Lincolnshire, has had beasts recovered from the distemper, which have herded with cattle fallen ill afterwards, and never met with a single instance of a second infection.

Mr. Loftie, an eminent surgeon at Canterbury, has inquired for me of the farmers and graziers in that part of Kent, and about Romney-Marsh; and from whence no belief of a second infection can be had.

The Rev. Dr. Fountayne, Dean of York, writes me word, that no beast has been known, in his neighbourhood, to have had the distemper twice. And several persons from that county, and others, have told me the same thing.

If the above testimony of persons of character and veracity, together with the concurrent persuasion of farmers in general, be allowed of, it must be determined, that there is no instance of a second infection. Supposing now it should appear, that this distemper

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is regularly, as in the natural way, tho' in a milder manner, produced by inoculation, and that inoculation secures a beast also from a second infection; then undoubtedly inoculation will be recommendable.

The very few trials made in England, and those not with the greatest exactness or propriety, will yet serve to put this matter out of all doubt.

The Rev. Dean of York had five beasts inoculated, by means of a skein of cotton dipped in the matter, and passed thro' a hole, like a seaton, in the dew-lap. Of these five, one cow near the time of calving died: the other four, after going thro' the several stages of this contagious disease, recovered; two of which, being cows young with calf, did not slip their calves. All four have herded with distempered cattle a long while, and never had the least symptom of a second infection.

Mr. Bewley, a surgeon of reputation in Lincolnshire, inoculated three beasts two years old, for Mr. Wiggleworth of Manton, in the dew-lap, and with *mucus* from the nostrils. All three had the regular symptoms of the contagious distemper in a mild manner, recovered, and tho' they herded a twelve-month after with five or six distempered beasts, they never were the least affected. Mr. Bewley also declared to Mr. Thorpe, that there never was one instance produced, that he knew of, of a second infection.

Since it is plain, that notwithstanding neither well-digested *pus* was made use of, nor incisions made in the properest places, and it may be supposed few medicines were given; yet inoculation succeeded so

as to bring on the distemper in a regular and mild manner, as appears by the cows with calf not slipping their calves. One may fairly conclude, that in this contagious distemper, like unto the small-pox, the practice of inoculation is not only warrantable, but much to be recommended.

But how comes it then, that neither by application, digestion, nor inoculation, the distemper was not communicated in France ?

The Marquis says, that this distemper is not communicated but from one beast to another immediately. I must beg leave to say, that to my knowledge the distemper in February 1756 was carried from the farm-yard, where I visited some distempered cattle, to two other farm-yards, each at a considerable distance, without any communication of the cattle with each other, and merely by the means of servants going to and fro, or of dogs.

The experiments made on four beasts, by tying over their heads part of distempered hides, or pieces of linen and woollen cloth or silk, which had received the breath and steams of dying cattle, serve to shew, by the bullock's forcing off the cloth tied about him, that the putrid stench was disagreeable to him ; but that neither his blood, nor that of the other three beasts, was then in a state to receive the infection.

With regard to the pustules, which the Marquis relates were mixed with oats and bran, or dissolved in white wine ; the distempered bile, which was mixed with milk ; milk taken from diseased cows ; water, in which part of a distempered hide had been steeped ; and the precaution taken to force these

mixtures into the paunch of calves, by means of a funnel, whose end was covered with a piece of raw distempered skin, that the beast might both swallow and suck in the disease. All these experiments could have no other effect than what followed ; which was, that the acrimony of the distempered bile created first a *nausea*, and then produced a violent scouring, which killed the beast, leaving marks of its irritation on the intestines.

The practice of inoculation is but lately followed, and even now but little known, in the provinces of France. Its advantages have not long since been strangely disputed at Paris. In the case of inoculating cattle, instead of a slip of raw hide taken from a beast just dead, or putting a pustule into the neck, they should either have passed in the dewlap cotton or silk dipped in well-digested *pus*, or have inserted in proper incisions cotton-thread or silk soaked with *pus* either on the shoulders or buttocks ; the true way of inoculating in the English manner. Some persons have indeed thought, that to inoculate with the blood of the infected would answer the intention ; but most of the modern practitioners chuse to depend on digested matter.

Several constitutions will not receive infection, let them be inoculated ever so judiciously. A Ranby, a Hawkins, a Middleton, and other inoculators, will tell us, that the incisions have sometimes suppurated so much, and pustules have appeared round the edges of the wound, without any other particular marks of the disease ; and yet the patient has never had the small-pox afterwards. The Marquis mentions an instance somewhat of the same kind in his first Memoir, p. 147.

The examination of these very important and interesting particulars has, I observe, drawn me into a prolixity, which I fear may prove tedious to your Lordship: but should I have removed all doubts, and brought convincing proofs of the absurdity of fearing a second infection; should I have shewn inoculation to be a necessary practice, and that the contagious distemper may be communicated more ways than one; I hope your Lordship will excuse the length of this letter. I shall only add my earnest wishes, that the legislature may, by effectual means, prevent the importation of distempered cattle and hides into these kingdoms; the only means of naturalizing and perpetuating a dreadful distemper, now, thank God! much decreased among us.

I am, with the greatest respect,

My Lord,

Your Lordship's

Most humble and most obedient Servant,

Huntingdon,
26 Nov. 1757.

Daniel Peter Layard.

LXX. *Trigonometry abridged.* By the Rev.
Patrick Murdoch, A. M. F. R. S.

Read Feb. 2, 1758. **T**HE cases in trigonometry, that can properly be called different from one another are no more than *four*; which may be resolved by *three* general rules or theorems, expressed